

**Delaware Department of Transportation
Division of Transportation Solutions
Design Guidance Memorandum**

Memorandum Number 1-20

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|-----------------------|----------------------------|----------------------------------|
| 1. Road Design Manual | 2. Bridge Design Manual | 3. Utilities Design Manual |
| 4. Real Estate Manual | 5. Standard Specifications | 6. Standard Construction Details |

Title: Pipe Materials Effective date: 9/10/2007

Sections to Implement:

<u>X</u> Project Development	<u>X</u> Planning	<u>X</u> DTC
<u>X</u> Bridge	<u>X</u> Quality	<u>X</u> Traffic
<u>X</u> Team Support	<u>X</u> Maintenance &	<u> </u> Other _____
<u>X</u> Utilities	Operations	

I. Purpose

To provide guidance on DelDOT's policy for the selection of pipe materials. This guidance defines the locations where various pipe products are considered to be equally acceptable for all projects. This information shall be used to determine which pipe products will be competitively bid for projects with Federal participation. The project manager and/or designer shall determine which alternative product shall be specified from the materials considered adequate for the installation. The decision shall be made based on economics, available cover and any other factors that may affect the performance of the pipe (i.e., soil pH, type of water exposure, susceptibility to abrasion, fire, etc.). Alternative pipe products will not have to be bid if the factors considered in the choice of pipe material have been documented in the project's drainage report or quantity calculations.

II. Design Guidance

For DelDOT projects, there are four service levels of pipe installations defined as follows. The pipe materials listed under each service level are considered equally acceptable for that level.

- **Service Level I Pipe Installations** require an expected service life of 75 years or more. All pipe which is to be installed under roadways with a classification of expressway, arterial or collector shall be service level I. This includes pipe running transversely across the road and longitudinally under the pavement and/or curb. Additionally, pipe outside of the roadway for expressways, arterials and collectors shall be a service level I installation unless future roadway widening over the pipe is not anticipated.
 - Only Reinforced Concrete Pipe (RCP) is considered to have a service life of 75 years or more. The class of RCP shall be specified in the plans. RCP shall be manufactured and installed in accordance with Section 612 of the Standard Specifications.
- **Service Level II Pipe Installations** require an expected service life of 50 years or more. All pipes that are to be installed under local roadways and high volume commercial entrances (such as shopping centers) shall be service level II or better. This includes pipe running transversely across the road and pipe running longitudinally under the pavement and/or curb.

Additionally, pipe outside of the roadway for local roads shall be service level II installations. Pipe installations on expressways, arterials and collectors that are outside of the roadway and in locations where future roadway widening over the pipe is not anticipated may also be service level II installations. The following products are considered to have a service life of 50 years or more and are equally acceptable. Service level I pipes may also be used for these installations.

- Corrugated Aluminum Pipe and Spiral Rib Aluminum Pipe – Aluminum pipe is considered to have a service life of 50 years. The type of aluminum pipe shall be specified in the plans. Aluminum pipes shall be manufactured and installed in accordance with Section 614 of the Standard Specifications. Metal pipe shall not be used where there may be standing water in the pipe for longer than 12 hours.
- High Density Polyethylene (HDPE) Pipe – HDPE pipe is considered to have an expected service life of 50 years. The maximum allowable diameter for use on DelDOT projects is 60 inches. HDPE pipes shall be manufactured and installed in accordance with AASHTO M294 and the Special Provisions for the item.
- Polyvinyl Chloride Profile Wall (PVC PW) Drain Pipe – PVC PW pipe is considered to have an expected service life of 50 years. The maximum allowable diameter for use on DelDOT projects is 48 inches. PVC PW pipes shall be manufactured and installed in accordance with AASHTO M304 and the Special Provisions for the item.
- **Service Level III Pipe Installations** require an expected service life of 25 years or more for commercial entrances and multi-family residential entrances. High volume entrances, such as those for large shopping malls, shall be a minimum of service level II. The following products are considered to have a service life of 25 years or more and are equally acceptable. Service level I and II pipes may also be used for these installations.
 - Polymer-Coated Corrugated Steel Pipe – Polymer-coated corrugated steel pipe is considered to have a service life of 35 years. Polymer-coated corrugated steel pipes shall be manufactured in accordance with AASHTO M245 and installed in accordance with Section 614 of the Standard Specifications. Installation sites shall be limited to those where the soil and water have a pH from 3 to 12 and a soil resistivity above 200 ohm-cm. Metal pipe shall not be used where there may be standing water in the pipe for longer than 12 hours.
 - Aluminum-Coated (Type 2) Corrugated Steel Pipe – Aluminum-coated (Type 2) corrugated steel pipe is considered to have a service life of 25 years. Aluminum-coated (Type 2) corrugated steel pipes shall be manufactured and installed in accordance with Section 614 of the Standard Specifications. Installation sites shall be limited to those where the soil and water have a pH from 5 to 9 and a soil resistivity above 1,500 ohm-cm. Metal pipe shall not be used where there may be standing water in the pipe for longer than 12 hours.
- **Service Level IV Pipe Installations** require an expected service life of 15 years or more for residential driveway entrances. Service level I, II and III pipes may also be used for these installations.
 - Galvanized Corrugated Steel Pipe – Galvanized corrugated steel pipe is considered to have a service life of 15 years. Galvanized corrugated steel pipes shall be manufactured and installed in accordance with Section 614 of the Standard Specifications. Installation sites shall be limited to those where the soil and water have a pH from 6 to 10 and a soil

resistivity of 2,000 to 8,000 ohm-cm. Metal pipe shall not be used where there may be standing water in the pipe for longer than 12 hours.

Other pipe materials may be considered for installation with approval from an assistant director. The choice of a pipe material for a particular project shall be documented in the project's drainage report or quantity calculations.

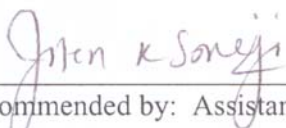
III. Justification

This guidance has been formed so that DelDOT will be in compliance with the Federal Highway Administration's Pipe Selection Final Rule Memo dated November 30, 2006, from Dwight Horne, which states the following:

"With the December 15, 2006, effective date of the final rule, the States should be considering all available pipe products that are judged to be of satisfactory quality and equally acceptable on the basis of engineering and economic analyses. Where such products appear to be equal, alternative bidding practices must be used as required by 23 CFR 635.411(b). Where alternative products are determined to have different engineering and economic properties, contracting agencies may select a specific material or product based on the required engineering properties and/or life cycle cost criteria. In such cases, the State DOT should document its material selection decision on a project or program basis as appropriate."

Prepared by: Pipe Material Selection Committee

Date:

for 
Recommended by: Assistant Director – Design

7/31/07

Date


Approved: Chief Engineer

9/4/07

Date

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